MISSOURI DEPARTMENT OF TRANSPORTATION
MATERIALS ENGINEERING
Jefferson City, Missouri

Test Method
MODOT T57
DETERMINATION OF MANGANESE AND/OR COPPER IN STEEL

1.0 Scope. This method describes a procedure for determining the percent Manganese and/or Copper in steel by atomic absorption spectrophotometry.

2.0 Reagents and Apparatus.

2.1 An Atomic Absorption Spectrophotometer.

2.2 Nitric Acid (HNO_3), 1.42 specific gravity.

2.3 Steel Standards. A supply of National Institute of Standards and Technology steel samples.

3.0 Procedure.

3.1 Selection of Standards.

3.1.1 Select a series of National Institute of Standards and Technology steel samples to bracket the expected concentration of manganese and/or copper in the steel samples.

3.2 Preparation of standard solutions and sample solutions.

3.2.1 Weigh, to the nearest 0.1 mg, 0.500 g of steel standard or steel sample. Transfer to a 250-mL beaker, add 50 mL of 1:3 HNO_3, cover and heat near boiling until dissolution is complete. Filter, while hot, through Whatman No. 41 filter paper into a 1000-mL volumetric flask. Wash the beaker and filter paper thoroughly with hot water, cool to room temperature and dilute to volume with distilled water.

3.2.2 Following the procedure outlined in 3.2.1, prepare a blank solution using a sample of iron or steel known to contain no manganese or copper.

3.3 Calibrate the instrument using the blank solution and the standard solutions, then determine the manganese and/or copper concentration in the sample solution.

4.0 Calculation and Report.

4.1 The method of calculation will vary with the make and model of instrument used.

Report the results to the nearest 0.01% as follows:

% Manganese (Mn)
% Copper (Cu)